EPP-HAZARDOUS CHEMICAL REPLACEMENTS IN CHRONOLOGICAL ORDER

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Sorted by chemical type.

Successes:

- Chromic trioxide
- Hexane
- Machine shop chemicals
- MEK
- Mercury
- Methylene chloride
- Ozone depleters

- Various replacement or new EPP applications
  - Adhesive removal
  - Brake cleaner
  - Paint removal
  - Solvent 142
  - Photoprocessing

- Chemical inventory reductions

HAZARDOUS CHEMICAL REPLACEMENTS

Successes:

CHROMIC TRIOXIDE

- May 2003: The Hangar (4) is using **SEMPENs paint touch-up sticks** - for **small jobs only** to replace Iridite (contains **chromic trioxide,** a carcinogen). Involved: Steve Hayes, Bud Schutte.

HEXANE

- January 2003: Garage (104): **QED** replaced **hexane** (a neurotoxin) in their **parts cleaning tank**. QED is manufactured by Ecolink, a veteran-owned environmental company. Other products worked well also: Limonene (except for the odor) and Simple Green (but it contains a HAP - butoxyethanol). QED (a less-hazardous petroleum product) had no odor, degreased quickly, melted old gasket material, and has few health/ environmental issues. Involved: Howard Gregory, Dana Sanvido, Daryl Sanvido, and Pete Kennedy.

MACHINE SHOP CHEMICALS

- July 2003 listed: **Garage** (104): The Garage discontinued use of **DoAll Steel Ink Brush in a Can and Aerosol** (1,1,1-trichloroethane) products. These products contained MEK, acetone, toluene, and xylene. Involved: Howard Gregory, Dana Sanvido, Daryl Sanvido.

- October 2003: **10 X 10 Wind Tunnel Machine Shop** (85): **Tap Magic** (111-trichloroethane – ozone depleter, dimethoxymethane, 1,2-butylene oxide, tert-butyl alcohol) was replaced with **Acculube Paste and Acculube #10** (75-85% vegetable oils). Involved: Dan Kovach.

MEK

- February 2003: The Hangar (4) used **MEK** as a cleaner for a single-layer paint remover. They have switched to using **alcohol** instead. Involved: Steve Hayes, Bud Schutte.

- May 2003: **Calibration Lab** (21-16) has disposed of and discontinued use of several **MEK** products. Involved: Perry LaRosa, Dale Smejkal, and Jack Weigand.

- August 2003: The Fabrication Shop (50) was using **MEK to clean solder joints,** but now uses **alcohol**. Involved: Bob Wells.

- December 2003: Temperature Composites Lab (51 – 117) - **MEK** is used to clean spray **nozzles that are used in application of graphite**. Bob Angus needed a replacement that

has quick evaporation and leaves no residue. He is now successfully using **alcohol** as a replacement. Involved: Bob Angus.

MERCURY

- Pre-June 2002: **Peel Away-1** tested and used by Akima for joints and small areas that contained **lead-based paint**. Peel Away holds the lead. Also any contractor has to get a safety permit to strip paint. During this process they're asked what they're using, and a list of EPP paint strippers from Walt's PPOA is recommended. Involved: Akima, Betty Hodgson, Walt Kocher.

- August 2003: Three Teams (IH, CMT, and WMT) coordinated an effort to replace **mercury thermometers** with **alcohol** thermometers. Mercury is a hazardous, bioaccumulative heavy metal. Involved: IH, CMT, WMT.

METHYLENE CHLORIDE

- Summer 2002: **NMP** replaced **methylene chloride** products and other hazardous chemicals in the Fabrication Shop (50) and Machine Shop (14). They wanted to replace as many chemicals as possible (including acetone) with just one EPP product. NMP is being used for: removal of dyes, grease, and oils from metals, precision cleaning of thermocouple welding, soldering, brazing, degreasing and adhesive removal from wood, plastic, and fiberglas, and removing bluing from metal after layouts. Involved: Mike Cawthon, Eric Stevens, Tonya Phillips, Ken Ulicny.

- 2002: The Fabrication Shop (50) used to use **Caseway SC-125 with methylene chloride** to glue plexiglas for models. It would dissolve the plastic, allowing pieces to be pushed together and bonded. Now they use **selective laser contouring** (which uses powders, polymers, plastics), **rapid prototyping** (or they farm this out), or **stereo lithography**.

- September 2002: The Fabrication Shop (50) was **using methylene chloride to strip the paint off of trucks and beds**. Now they use water. They accidentally found this method when washing a truck with a high-powered washer; the paint came off. Now they hook a **high-powered hose** up to a fire hydrant (with permission) **to remove paint**. They collect the "run-off" for waste disposal.

- May 2003: Garage (104): They are now using the **Patch Rubber tire repair glue** (**heptane and acetone** versus a **methylene chloride** product) on a continuous basis. Involved: Howard Gregory, Dana Sanvido, Daryl Sanvido.

- June 19, 2003: Jim Shultz of Gilcrest (66) can use **Loctite Chisel Gasket Remover-Methylene Chloride-Free** for RTV gasket material only. This replaces the methylene chloride Loctite product they were using. They still need a replacement to use on Permatex and Master Gasket. Involved: Jim Shultz, Angela Windau.

- Summer 2002: Garage – **Bead Sealer** – Replaced **methylene chloride**, trike, xylene, toluene, 1,2 butylene oxide bead sealer with **heptane** and carbon black Patch Rubber bead sealer. Involved: Howard Gregory.

- Summer 2003: Gilcrest – **Gasket removal** – Replacing **methylene chloride** with **Stoddard Solvent/n-propyl-bromide** temporarily. Looking for a better alternative, though. One gasket adhesive type (RTV) may be replaced. The other two (Permatex and Master Gasket) need a stronger/different formulation. That project is listed under Work in Progress. Involved: Jim Shultz, Linda Sekura.

- July 2003 listed: Maintenance and Repair Bldg (107) – **Jasco Adhesive and Sealer Remover**, an adhesive remover with **methylene chloride** was being used for carpentry, masonry, and maintenance activities to remove adhesives from equipment and other substrates. Rich Olinek in Building 107 no longer allows employees to use methylene chloride due to OSHA standards. They now use **air chisels** with 1 ½" blades. Involved: Rich Olinek.

OZONE DEPLETERS

- December 2001: **Oxygen Cleaning** - **ODC replacement** – The Engine Components Research Lab needed a healthier and more environmentally friendly way of cleaning their 4-inch diameter, stainless steel, hi-pressure oxygen supply line. They had used **trichlorofluoroethane** (CFC 113), **dichlorofluoroethane** (HCFC-141B), or 1,1,1-trichloroethane (TCE), all of which deplete the ozone layer. White Sands Testing Facility (WSTF) came up with a replacement: they cleaned the interior of the pipe with heated **OAKITE-33 (phosphoric acid and butoxyethanol)** acid solution, rinsed with deionized water, then flushed with a basic OAKITE solution. The final rinse used deionized water, HFE-7100 was used to verify cleanliness, and then heated nitrogen gas was used to dry the pipe. (See also Other Large-Scale Projects.) Involved: Dallas Jenkins, Colman Zsiros, Christie Myers.

- July 10, 2003 – Gary Kostyak in Bldg 34 was using **1,1,1-trichloroethane** (methyl chloroform – a banned ozone depleter) – in a **3-step cleaning process** (1,1,1-trich, acetone, then methanol) to prepare items for PVD coatings. He will now replace the trich with - - **NOTHING**! He will stop using it, since he is aware of ODC issues and has educated his people to not touch samples before giving them to him. He will also look at an **NMP** MSDS and other possible alternatives in case he decides there is a need for a first step again. Involved: Gary Kostyak, Mike Quintin.

- July 24, 2003: **Aircraft oxygen lines, reservoirs and equipment** (on board and in shop) were being cleaned (from contamination with organic compounds) using alcohol, water-soluble solutions, and CFC-113. The Hangar replaced the **CFC-113 with ethyl alcohol**. Further systems are being reviewed by NASA, USAF, and USN. This project is listed under Work in Progress. Involved: Steve Hayes.

- July 2003 listed: The Hangar was using **1,1,1 trichloroethane for precision cleaning and general cleaning** of aircraft components. They have replaced it with **ethyl alcohol**. Involved: Steve Hayes, Bud Schutte.

- July 2003 listed: Hangar **- Aircraft oxygen lines, reservoirs and equipment** (on board and in shop) were being cleaned (from contamination with organic compounds) using alcohol, water-soluble solutions, and **CFC-113**. The Hangar replaced the CFC-113 with **ethyl alcohol**. Involved: Bud Schutte, Steve Hayes.

- December 2003 - Calibration Lab – **Electrical contact cleaners -** Replaced CFC-**113 and HCFC-141b** with **non-ODC, nonflammable, low hazardous chemical** (t-DCE), low residue, quick dry product that doesn't hurt plastics. Can use flammable, but will only stock nonflammable to be safe. Involved: Perry LaRosa, Linda Sekura.

VARIOUS REPLACEMENTS - OR - NEW APPLICATIONS WITH EPP PRODUCTS

- April 11 2003 – Tested adhesive removers on Bldg 6 lobby stairs – removal of remaining **adhesive from no-slip strips**. **Speed Release** worked best – melted adhesive away. The oily base seemed to be the key. It's 100% biobased – made from fatty acid methyl esters of plants. GRII, QED, and Simple Green didn't perform as well but did remove with more elbow grease. The solvent properties of these three seemed too "drying." The adhesive needed to be kept moist to lift off. The downside is that Speed Release's oiliness made the stairs slippery. According to the manufacturer, Phase III, GR II is a modified version that is best for floor stripping (contains NMP), but we preferred Speed Release. Involved: Loraine West.

- May 2003: Garage (104): They are ordering **Teksol EP aerosol Brake Cleaner** (**limonene** and naphtha versus **perchloroethylene** and ethylbenzene) on an ongoing basis. Dana had the idea to resurrect the Brake Buggy, using 5-gallon cans of the Teksol EP liquid Brake Cleaner. Since they are both the same product and compatible, they can use both products simultaneously, and capture the remainder to recycle within the Brake Buggy. Involved: Dana Sanvido.

- June 28, 2003: The Fabrication Shop successfully completed an EPP product test. KSC had requested immediate shipment of an aluminum flight strip, but they needed the paint removed. **Peel Away 7** with **NMP** (no methylene chloride content) was suggested by the P2 Team, 5 gallons was located in a store nearby, and the flight strip paint was easily removed in one day. Involved: Elmer Bartels, Peter Tschen.

- July 2003 listed: The Icing Tunnel (11) was **mopping the floor with Solvent 142** (Stoddard Solvent). This product was only used to clean excess oil from the floor after the heat exchanger was installed. They have since discontinued use. Involved: Dave Justavick.

- July 2003 listed: Image Tech Center (5) – **Photoprocessing**. Changed **from wet chemical** to **digital and off-site** contracting, reducing chemical waste greatly. Excess chemicals were disposed of as hazardous waste. Involved: Sharon Webber.

- July 2003: **Groundskeeping – Day Care Center** - 1) The new center needed an environmentally preferable solution to a weed/bee problem. An organic lawn care company suggested a **nontoxic lemon juice/vinegar herbicide**. 2) We had also searched for a **non-chemically-treated sod** (never found one) to use if the children need to move in before the grass grows, but it turned out sod will most likely not be needed. 3) Also, the **mulch** being used was **recycled human waste.** The mulch is a good biobased, recycled alternative, and should be used in other areas; but it was deemed inappropriate for Day Care use. (See also Sustainable Design Projects.)

CHEMICAL INVENTORY REDUCTIONS

- February 2003: **Chemical Supplies** (Bldg 21): Reduced stored chemicals – moved to a more just-in-time process. Also open to replacing electrical contact cleaners and defluxers in stock with EPP products. Involved: Jeanine Hanzel.

- May 2003: **Calibration Lab** (21-16) disposed of 63 hazardous products (116 total bottles and cans) in a two-week period, including 21 ozone depleters, MEK, methylene chloride, hexane, perchloroethylene, and trike, after a walk-through by an EPP person. Involved: Perry LaRosa, Dale Smejkal, and Jack Weigand.

- December 2003: **Plum Brook Chemical Reduction** – PBS has reduced hazardous chemical inventories in five sites, and can now discuss the possibility of implementing the P2 Committee's new chemical inventory procedure. Reducing chemicals in storage reduces the chance of accidental release, contributing to environmental and worker protection. Plus, it frees storage space and reduces the time it takes to do an inventory. Implementing the new chemical inventory process will allow for "just in time" ordering, reduce the need to guess at requirements at the start of each year, and enable participation in a Chemical Exchange website for sharing of excess chemicals. (See also Other Large-Scale Projects) Involved: Bob Lallier.